	Tag	Attributes	Text	Description
105	<cli>	-	-	Contains zero or more models
110	<mode>	name	-	Contains zero or more command tags. Attribute is required.
115	<command>	-	-	Contains a required keyword tag.
120	<keyword>	text	-	Contains zero or more keyword tags, with an optional action or help tag. Attribute is required.
125	<help>	-	Yes	May be embedded in keyword or arg elements.
130	<action>	object method	-	Contains zero or more arg tags. The attributes are required.
135	<arg>	-	-	Contains a single instance of type tag, may contain a help tag.
140	<type>	Type	-	Empty tag. Attribute is required, must be a valid java type.

FIG. 1

```
Command> show clock
  * 04:10:12. 621 UTC Thu May 6, 1993
```

200

```
Command> snow clock detail
  *04.10.18.109 UTC Thu May 6, 1998
  Time source is user configuration
```

205

```
</xml version="1.0" endodings="US-ASCII"?>
<!DOCTYPE cli SYSTEM "cli.dtd">
<cli>
<mode name="global">
. . . .
<command>
      <keyword text="show">
      <help>Show running system information</help>
 . . . .<!-lots of other show keywords. . . -->

        <keyword text="clock">
            <?help>display the system clock</help>
            <action object="Clock" method="show">
            </action>

            <keyword text="detail">
               <help>Display detailed information </help>
               action object="Clock" method="showDetail">
               </action>
            </keyword>
        </keyword>
       </keyword>
</command>
</mode>
</cli>
```

210

212

215

FIG. 2

```
Command >  clock set ?
           hh:mm:ss  Current Time

Command > clock set 00:00:00 ?
           <1-31> Day of the Month
           Month of the Year

Command > clock set 00:00:00 25 Sep ?
<1993-2035> fear


Command > clock set 00:00:00 25 Sep 2000

Command >
```

321 322 323 324

```
<command>
    <keyword text="clock">
      <help>Manage the System clock</help>
      <keyword text="set">
            <help> Set the time and date</help>
            <action object="Clock" method="set">
                  <arg> <!-time argument -->
                     <type type="java.land.String"></type>
                     <help>hh:mm:ss Current Time </help>
                  </arg>
                  <arg> <!-day of the month argument -->
                        <type type="java.lang.Integer"></type>
                  <help>&1t;1-31&gt; Day of the month</help>
                  </arg>
                  <arg> <!-day of the month argument -->
                        <type type="java.lang.Integer"></type>
                        <help>Month Month of the year </help>
                  </arg>
                  <arg> <!-year argument -->
                     <type type="java.lang.Integer"></type>
                     <help>&1t;1993-2035&gt; Year</help>
                  </arg>
               </action>
            </keyword>
         </keyword>
      </command>
```

325 327 328 329 330 335 340 345

FIG. 3

```
<?xml version ='1.0' encoding="us-ascii"?>
<!-DTD for cli description file-->

        <!-The cli tag is the topmost element. Contains zero or more modes. -->
<!ELEMENT cli (mode*)>

        <!--The mode tag contains zero or more command tags. The mode must
        have a name, for example "golbal", " exec", " config" -->
<!ELEMENT mode (command*)>
<!ATTLIST mode
        name CDATA #REQUIRED
>

        <!-The command tag contains a single keyword-->
<!ELEMENT command (keyword)>

        <!--The keyword tag contains zero or more subkeywords, with an optional
        single instance of action or help. The single attribute is the keyword test
        which must be present -->
<!ELEMENT keyword ((keyword)*, action?, help?>
<!ATTLIST keyword
        test CDATA #REQUIRED
>

        <!-- The action tag contains zero or more argument tags. The "object"
                        and "method" attributes must be present and defined"
<!ELEMENT action (arg*)>
<!ATTLIST action
        object CDATA #REQUIRED
        method CDATA #REQUIRED
>

        <!-- The arg tag contains a single instance of a type tag and an
        optional help tag -->
<!ELEMENT arg (type,help?)>

        <!--The type tag is an empty tag with a required attribute "type". The
        value of the attribute should be a Java class name -->
(!ELEMENT type EMPTY)>
<!ATTLIST arg
        type CDATA #REQUIRED
>

        <!-- The help tag encloses some text -->
<!ELEMENT help (#PCDATA)>
```

FIG. 4

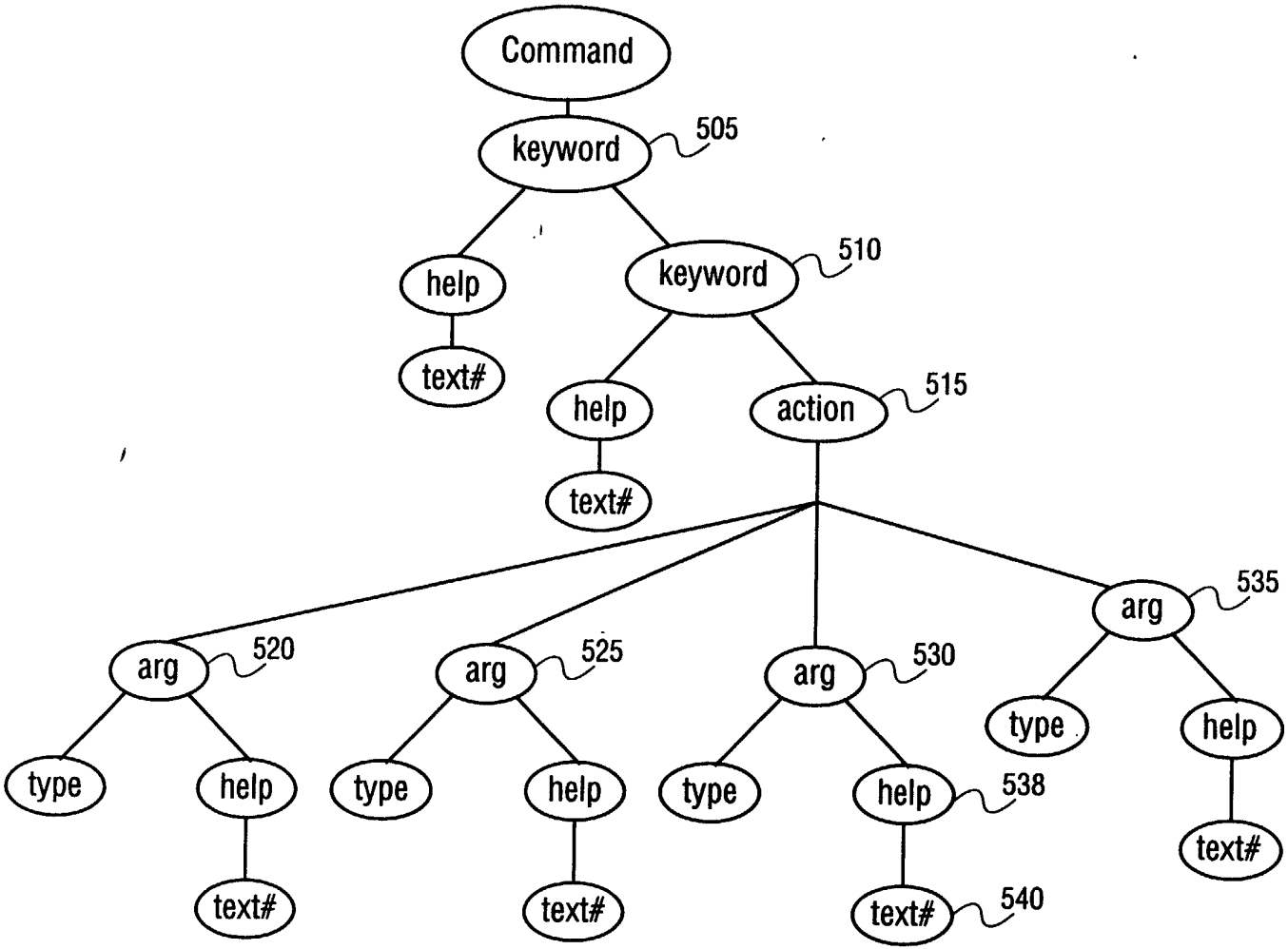


FIG. 5

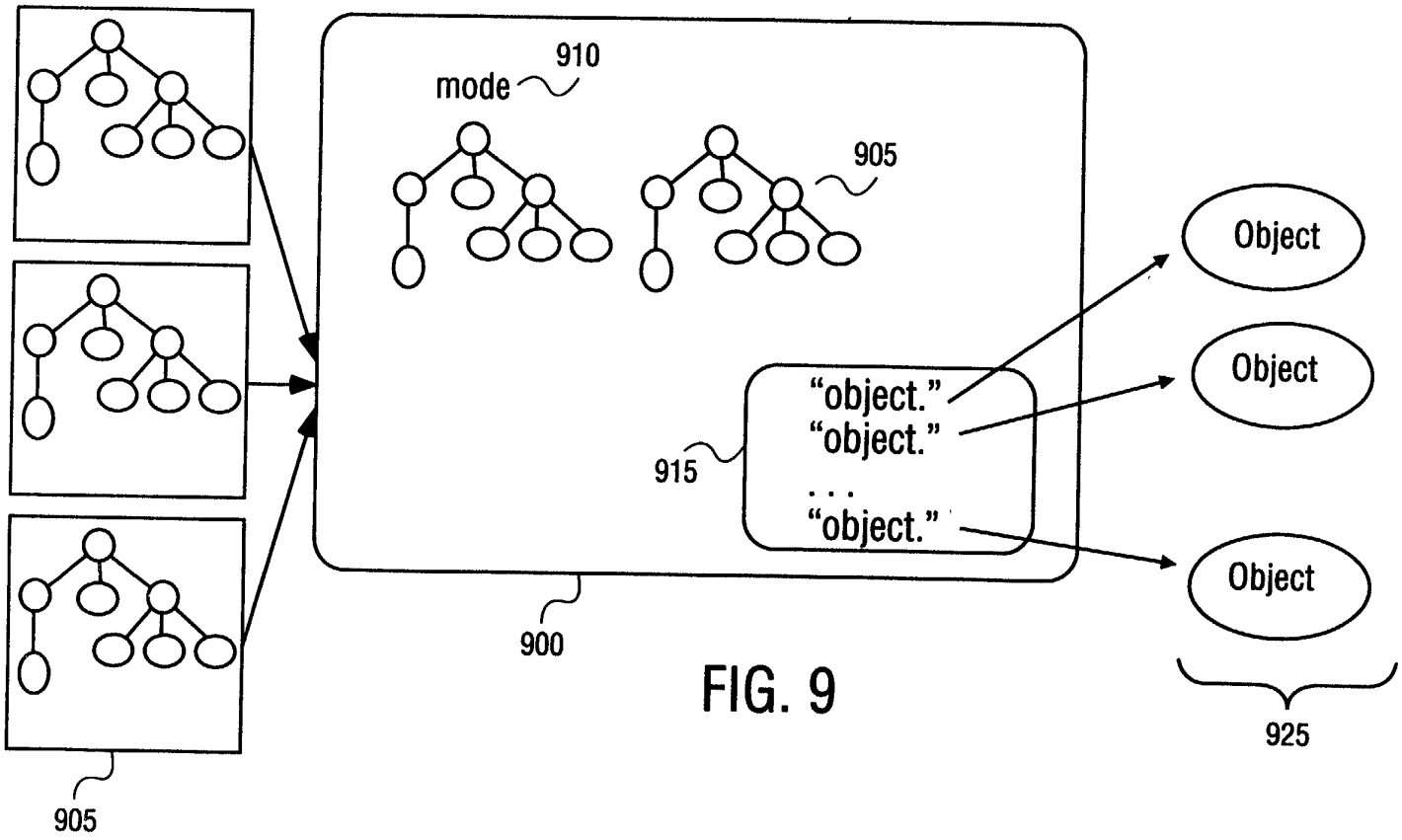


FIG. 9

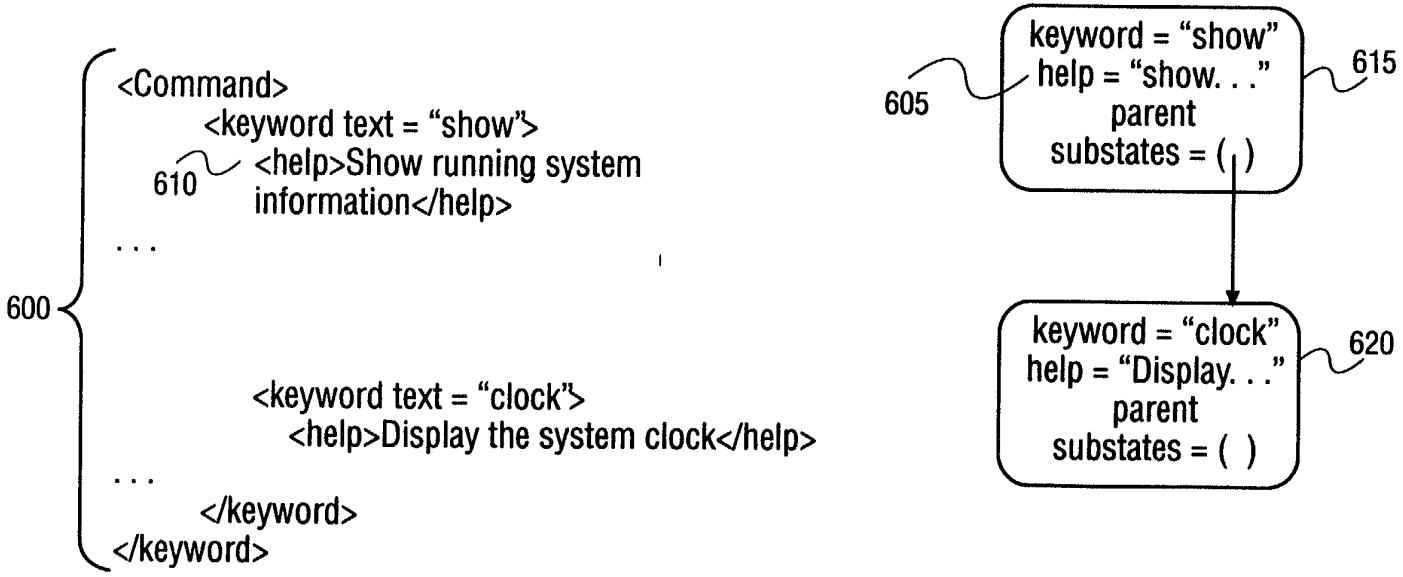


FIG. 6

```
<keyword text = "FastEthernet">
    <help>FastEthernet IEEE 802.3</help>
        <action object = "ethManager" method="show>
            <arg>
                <type type="java.lang.String"><type>
                <help>
                    &lt;0-6&gt; FastEthernet interface number
                <help>
            </arg>
        </action>
</keyword>
```

700

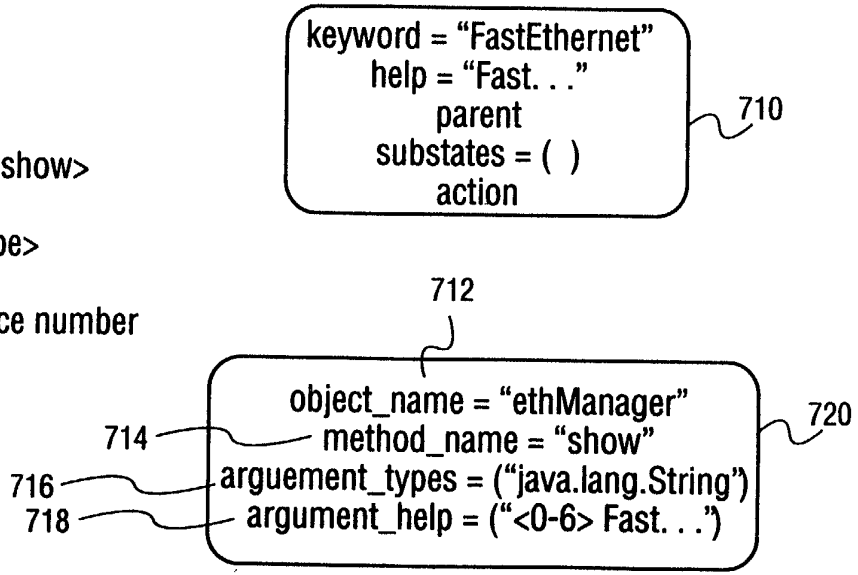


FIG. 7

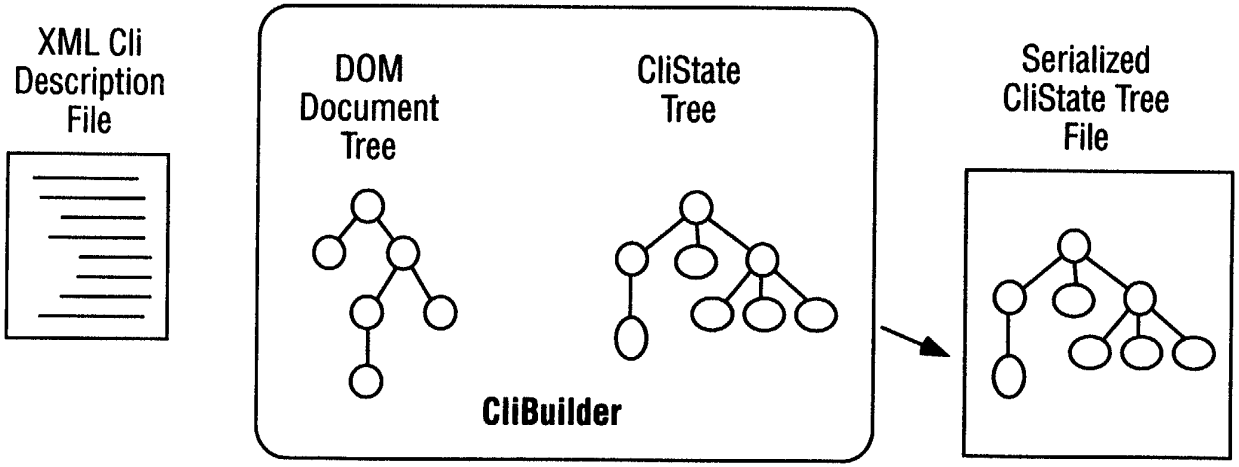


FIG. 8

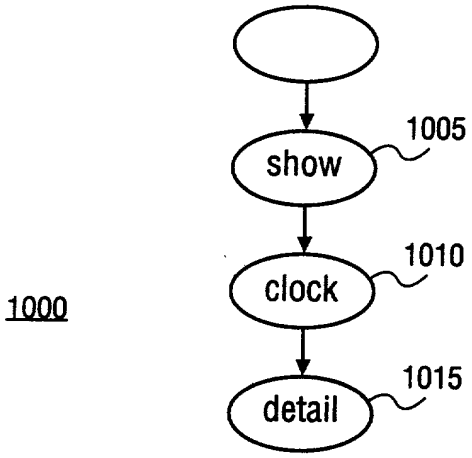


FIG. 10

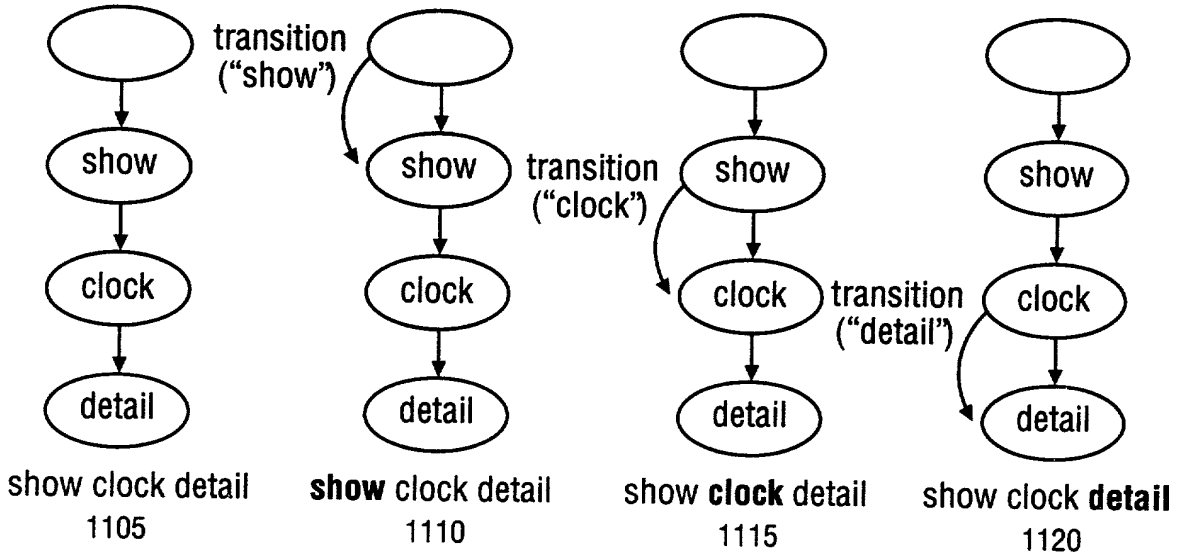


FIG. 11

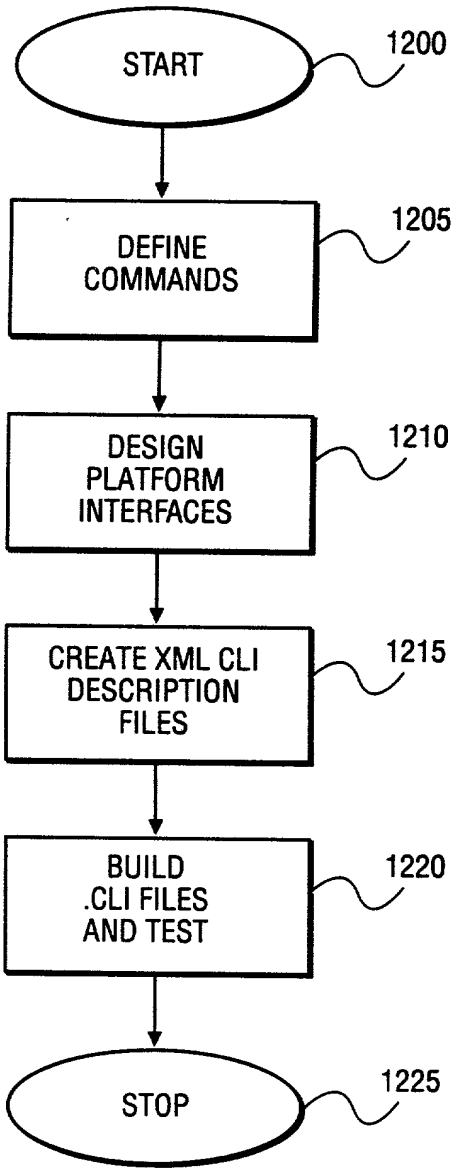

START
1200
DEFINE COMMANDS
1205
DESIGN PLATFORM INTERFACES
1210
CREATE XML CLI DESCRIPTION FILES
1215
BUILD .CLI FILES AND TEST
1220
STOP
1225

FIG. 12

Command	Keyword Set
show date	("show"," date")
show date detail	("show"," date"," detail")
clock set	("clock"," set")

1305

1310

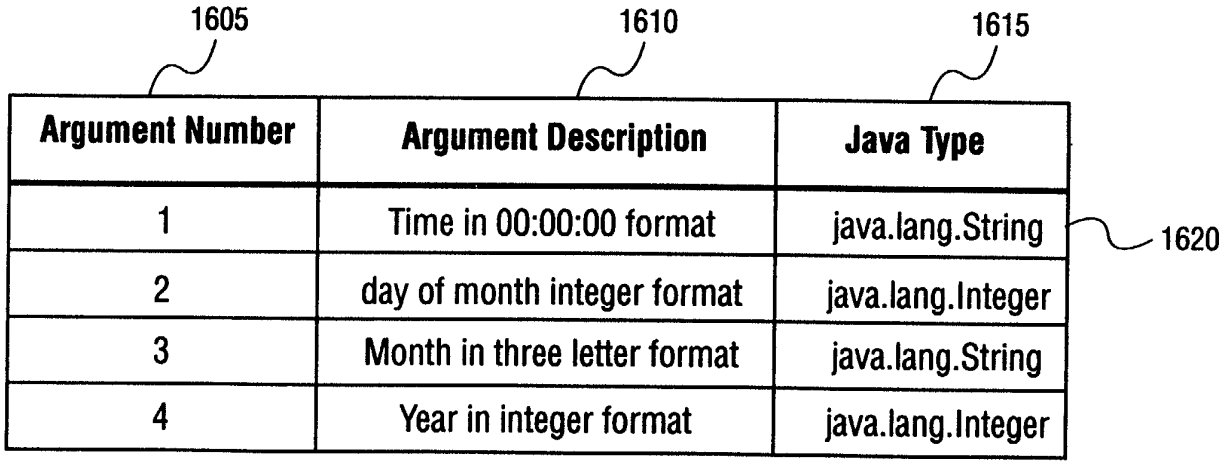
FIG. 13

Argument Number	Argument Description	Argument Help
1	Time in 00:00:00 format	hh:mm:ss Current time
2	day of the month in integer format	<1-31> Day of the month
3	month in three letter format	MONTH Month of the Year
4	Year in integer format	<1993-2035> Year

FIG. 14

Command Keyword Sequence	Help
show	show running system Information
clock	Manage the system clock
show clock	Display the system clock
show clock detail	Display detailed information
clock set	Set the time and date

FIG. 15



Argument Number	Argument Description	Java Type
1	Time in 00:00:00 format	java.lang.String
2	day of month integer format	java.lang.Integer
3	Month in three letter format	java.lang.String
4	Year in integer format	java.lang.Integer

FIG. 16

```
<?xml version='1.0 encoding='US...ASCII' ?>
<! DOCTYPE cli SYSTEM "cli.dtd'>
<cli>
<mode name="exec'>

<command>
        <keyword text= "show" >
        <help>Show running system information</help>
        .... <!--lots of other show keywords... -->

                <keyword text=" clock'>
                </help>Display the system clock </help>
                <action object="Clock" method= "show'>
                </action>

                <keyword text="detail'>
                <help>Display detailed information</help>
                action object="Clock" method="showDetail'>
                </action>
                </keyword>
        </keyword>
< / command>
```

FIG. 17

```
<command>
        <keyword text="clock"
        <help>Manage the System clock</help>

            <keyword test="set">
            <help> Set the time and date</help>
            <action object="Clock" method="set">

                <arg><!-- time argument -->
                <type type="Java.land.String"></type>
                <help>hh:mm:ss Current time</help>
                </arg>

                <arg> <! -- day of the month argument -->
                <type type=Java.land.Integer"></type>
                <help>&lt;1-31&gt; day of the month</help>
                </arg>

                <arg> <! -- day of the month argument -->
                <type type="Java.land.Integer"></type>
                <help>MONTH Month of the year</help>
                </arg>

                <arg> <! -- year argument -->
                <type type="Java.land.Integer"></type>
                <help>&lt;1993-2035&gt; Year</help>
                </arg>

            </action>
        </keyword>
    </keyword>
< / command>
```

FIG. 18

```
public void show ()  {
        SimpleDateFormat formatter =
           new SimpleDateFormat ("hh:mm:ss.SSS zzz EEE
MMM dd yyyy");
        System.out.println("*" + formatter.format
(new Date()));
}

public void showDetail () {
        this.show();
        if (Clock.source())
            System.out.println ("Time source is user
configuration");
        else
System.out.println ("No time source");
}
```

FIG. 19

```
public void set (String time, Integer day, String month, Integer year)
        throws IOException, InterruptedException, CLIArgumentException
        (
            // Validate the arguments
            SimpleDateFormat format = new SimpleDateFormat ("hh:mm:ss);
            format.setLenient (false);
            try { format parse (time)
            } catch (ParseException e) {
                throw new ArgumentException (1);
            }

            if (day.intValue() < 1 || day.intValue() > 31)
                throw new ArgumentException (2);

            format.applyPattem ("MMM");
            try { format.parse(month);
            } catch (ParseException e) {
                throw new ArgumentException (3);
            }

            if (year.intValue() < 1993 || year.intValue 0> 2035
                throw new ArgumentException (4);

            // One last check for day, month and year validity (e.g., Feb 31)
            format.applyPattem (" dd MMM yyy");
            try { format.parse(day.toString() + month + year.toString());
            } catch (parseException e) {
                CLIEngine.out.println("Invalid date (doesn't exist)");
                Return;
            }

            // Do the actual work
          String [] cmd = {" /bin/date", " -s", time + "" + day + "" + month + "" + year
                };
            Process proc = Rumtime.getRuntime().exec (Cmd);
            proc. waitFor(); if (proc.exitValue() > 0) {
            CLIEngine.err.println("Operation not permitted");
                return;
            }

            clock.sourceSet() ;
```

FIG. 20